US009089453B2

(12) **United States Patent**
McCabe

(10) **Patent No.: US 9,089,453 B2**
(45) **Date of Patent: *Jul. 28, 2015**

(54) **METHOD FOR PRODUCING ABSORBENT ARTICLE WITH STRETCH FILM SIDE PANEL AND APPLICATION OF INTERMITTENT DISCRETE COMPONENTS OF AN ABSORBENT ARTICLE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 102 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **13/915,388**

(22) Filed: **Jun. 11, 2013**

(65) **Prior Publication Data**

US 2013/0269864 A1 Oct. 17, 2013

Related U.S. Application Data

(63) Continuation-in-part of application No. 12/979,154, filed on Dec. 27, 2010, now Pat. No. 8,460,495.

(60) Provisional application No. 61/335,018, filed on Dec. 30, 2009.

(51) **Int. Cl.**
A61F 13/15 (2006.01)

(52) **U.S. Cl.**
CPC ***A61F 13/15699*** (2013.01); ***A61F 13/15707*** (2013.01); ***A61F 13/15804*** (2013.01); *Y10T 156/10* (2015.01); *Y10T 156/1051* (2015.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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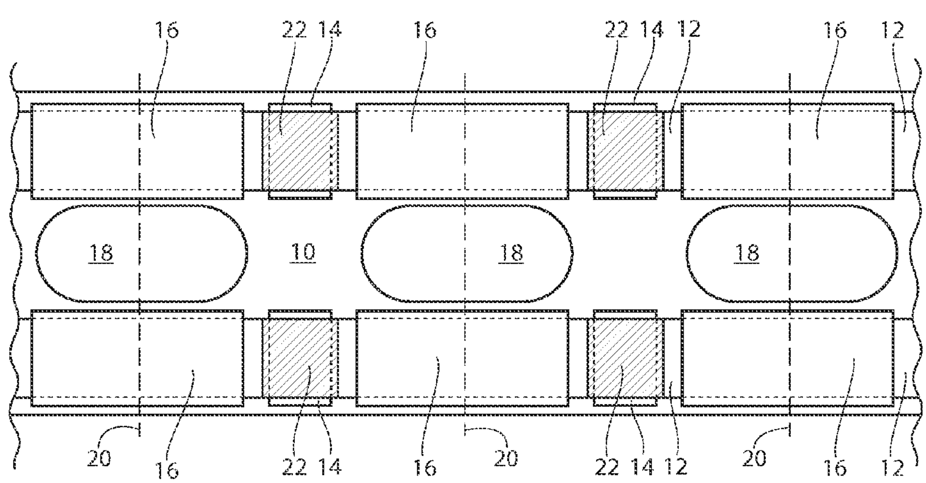
(57) **ABSTRACT**

Apparatus and methods are provided to allow for creation of a configured laminate of a non-woven material, to which a character strip is applied, the character strip exposed by either heat severing and removal of overlying materials, or intermittent application of overlying materials to leave the desired portions of the character strip exposed. A simultaneously formed core insert is applied to a preformed chassis web.

4 Claims, 11 Drawing Sheets



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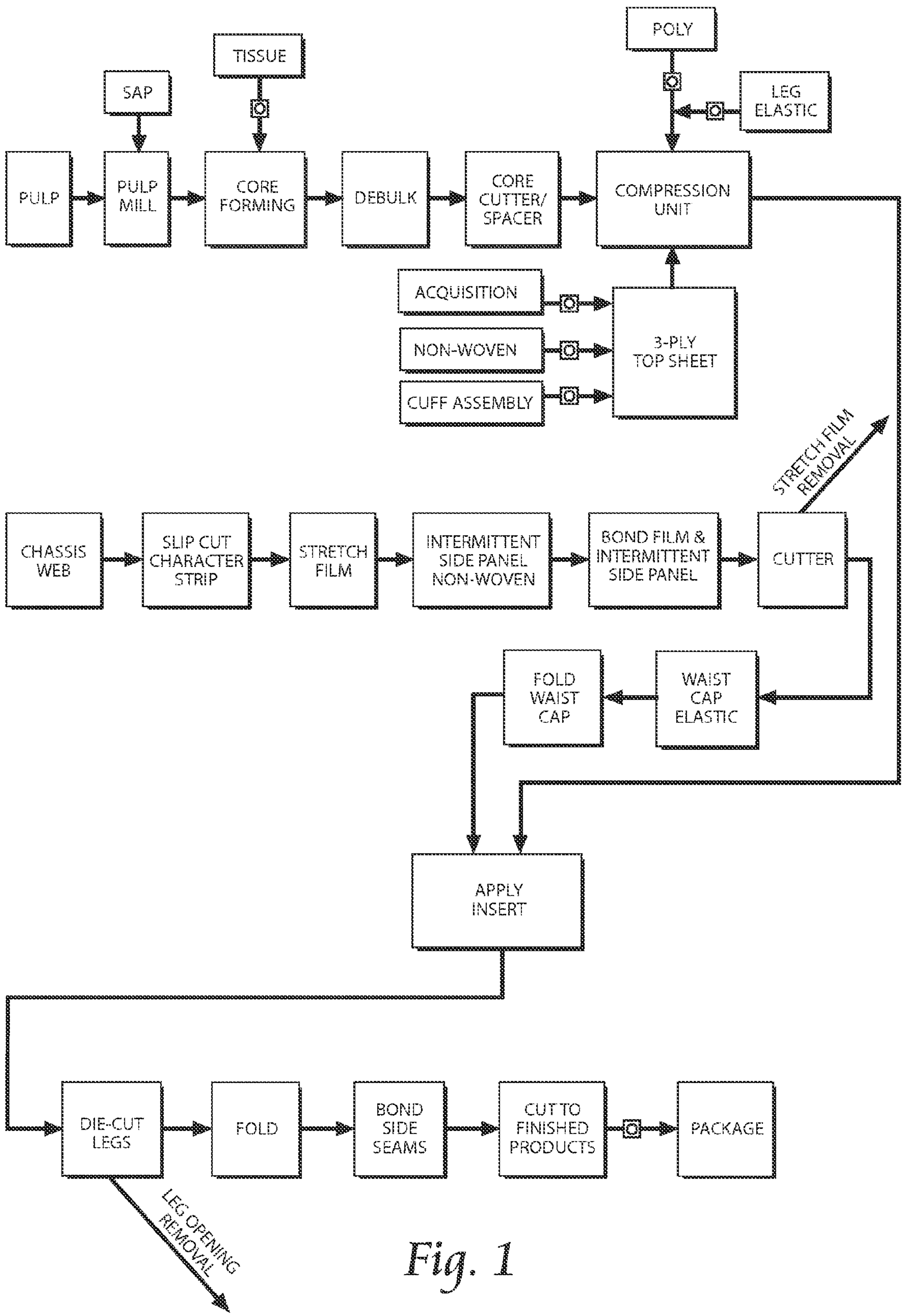
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SAP
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PULP
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DEBULK
CORE CUTTER/ SPACER
COMPRESSION UNIT
ACQUISITION
NON-WOVEN
CUFF ASSEMBLY
3-PLY TOP SHEET
STRETCH FILM REMOVAL
CHASSIS WEB
SLIP CUT CHARACTER STRIP
STRETCH FILM
INTERMITTENT SIDE PANEL NON-WOVEN
BOND FILM & INTERMITTENT SIDE PANEL
CUTTER
FOLD WAIST CAP
WAIST CAP ELASTIC
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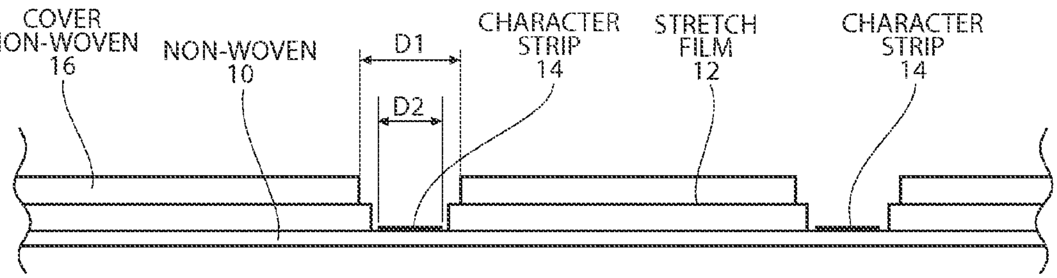
FOLD
BOND SIDE SEAMS
CUT TO FINISHED PRODUCTS
PACKAGE
LEG OPENING REMOVAL

Fig. 1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CHARACTER
STRIP
14

Fig. 2

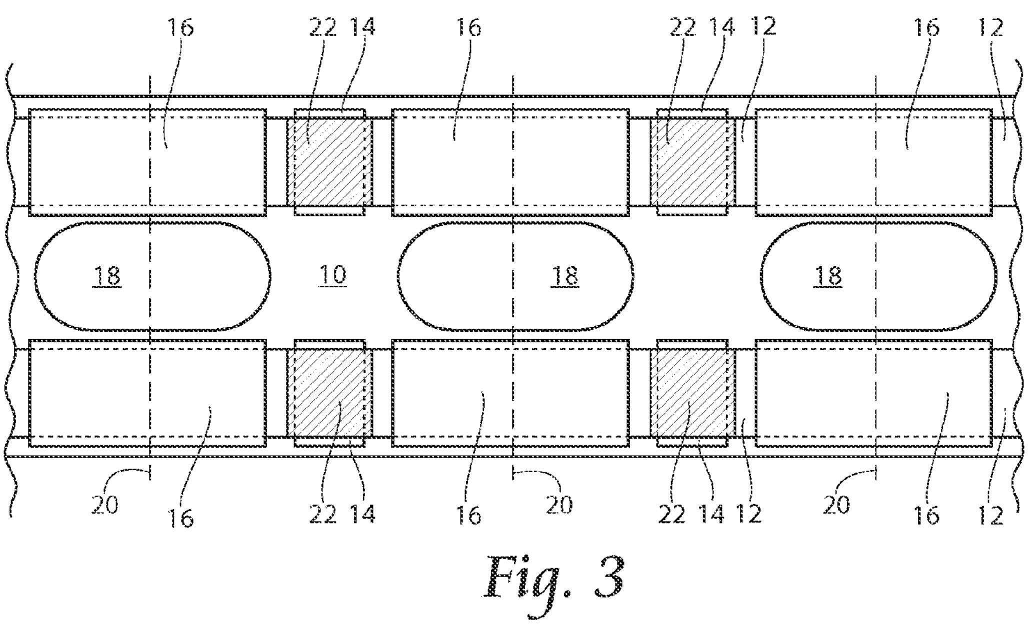
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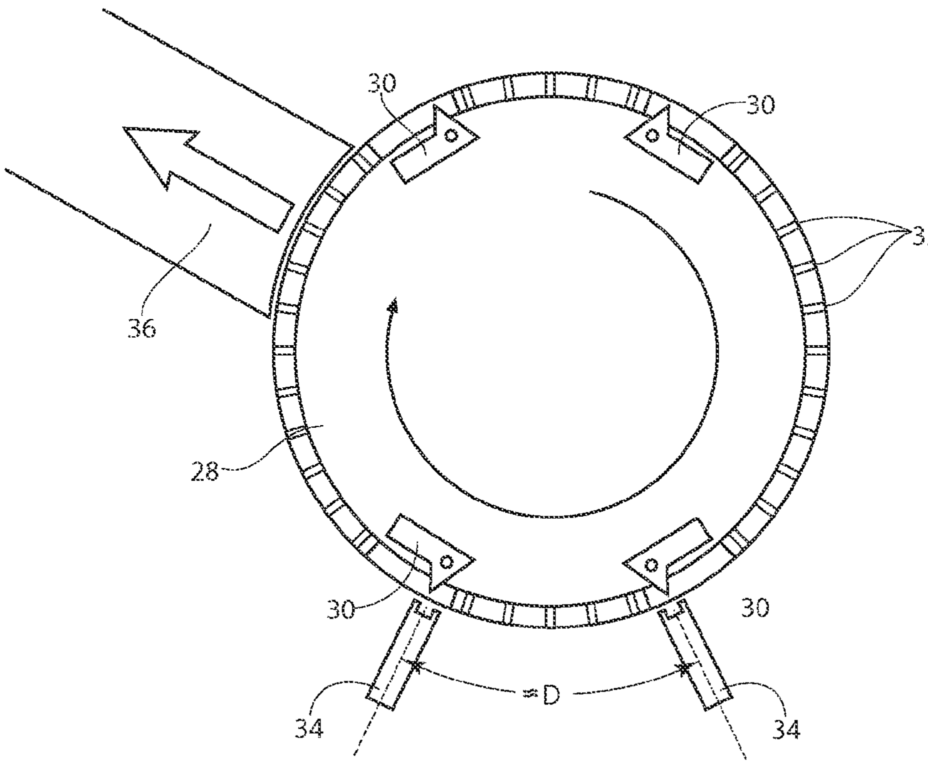
Fig. 3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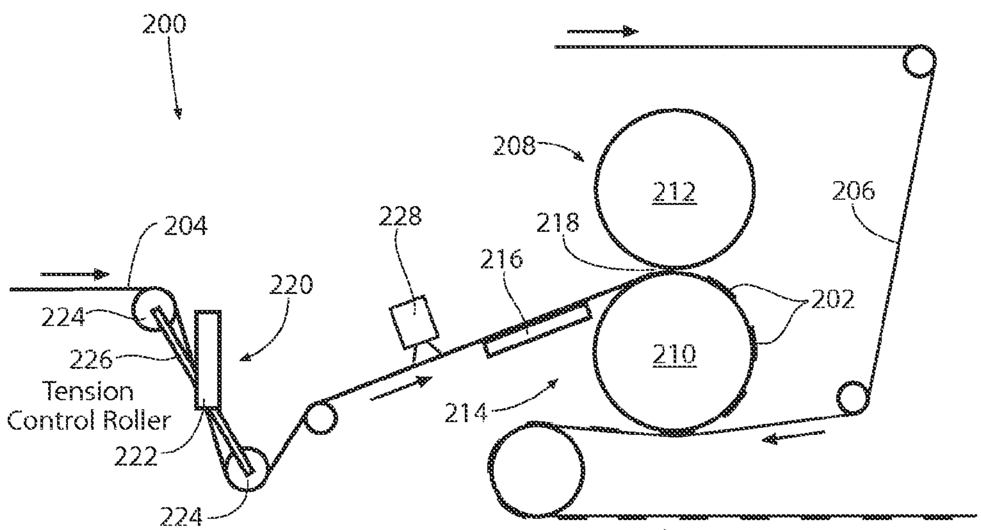
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Fig. 5

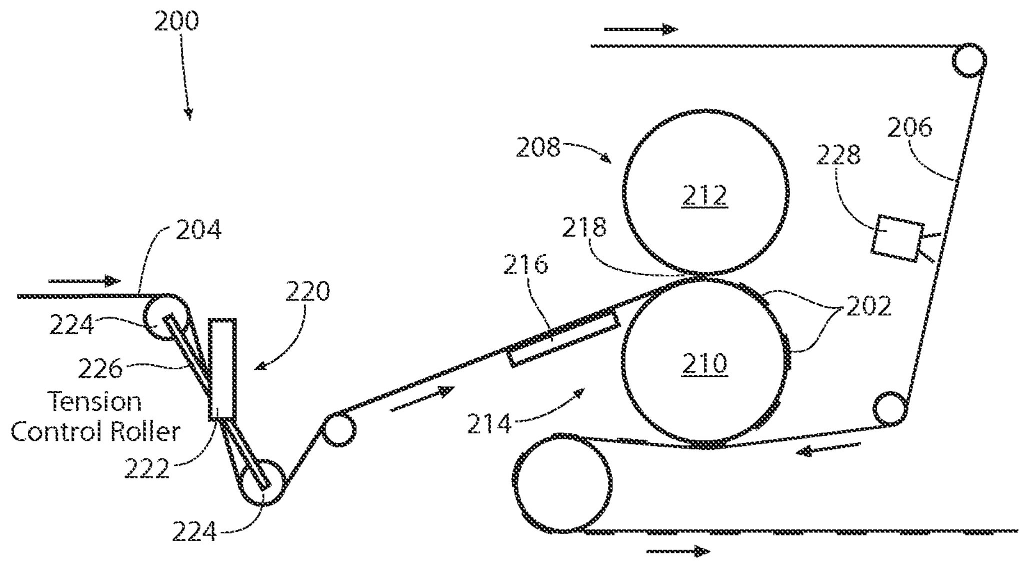
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Fig. 6

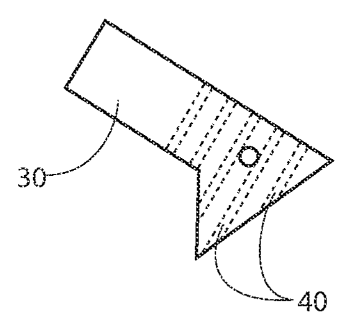
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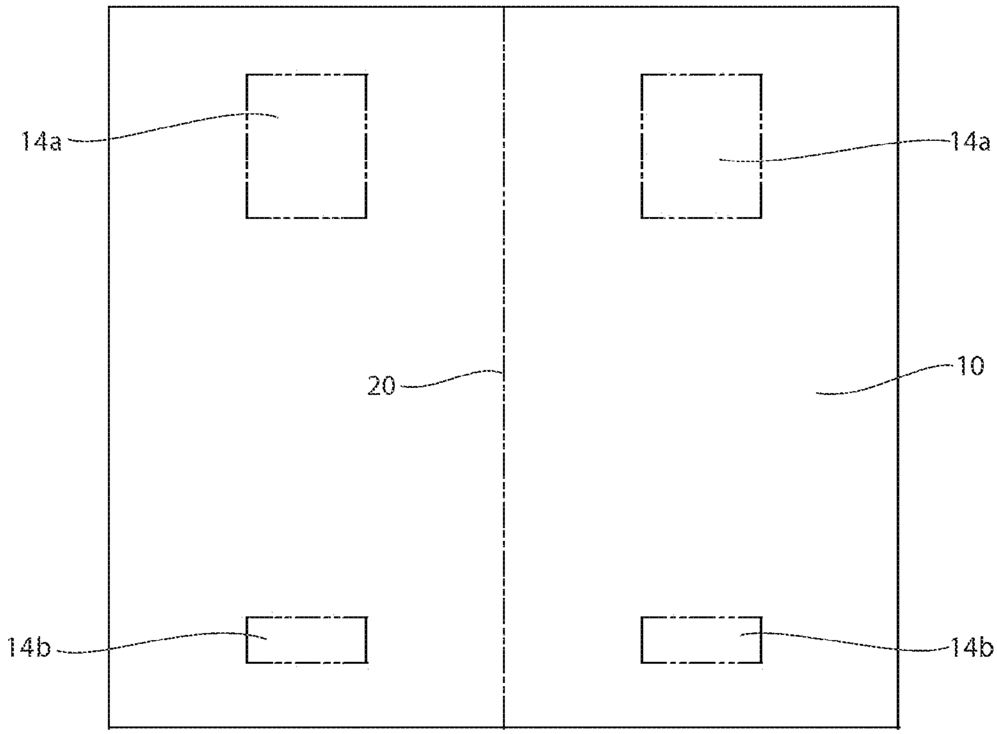
Fig. 7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14b

Fig. 8

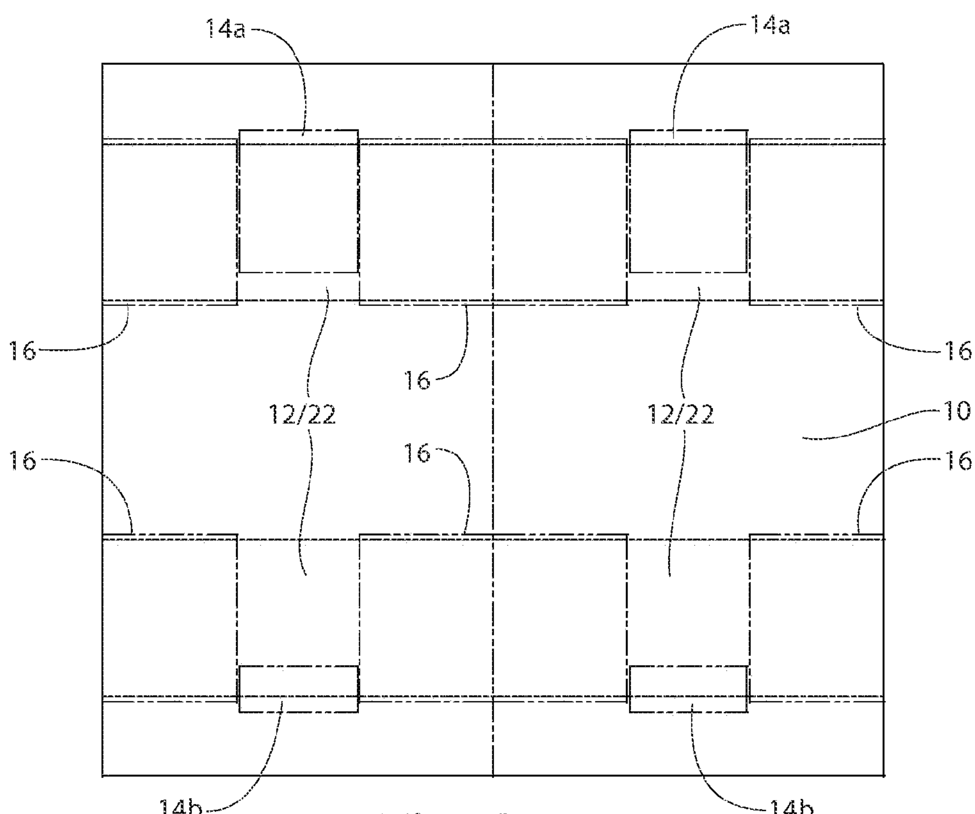
14a
14a
16
16
16
12/22
12/22
10
16
16
16
14b
14b

Fig. 9

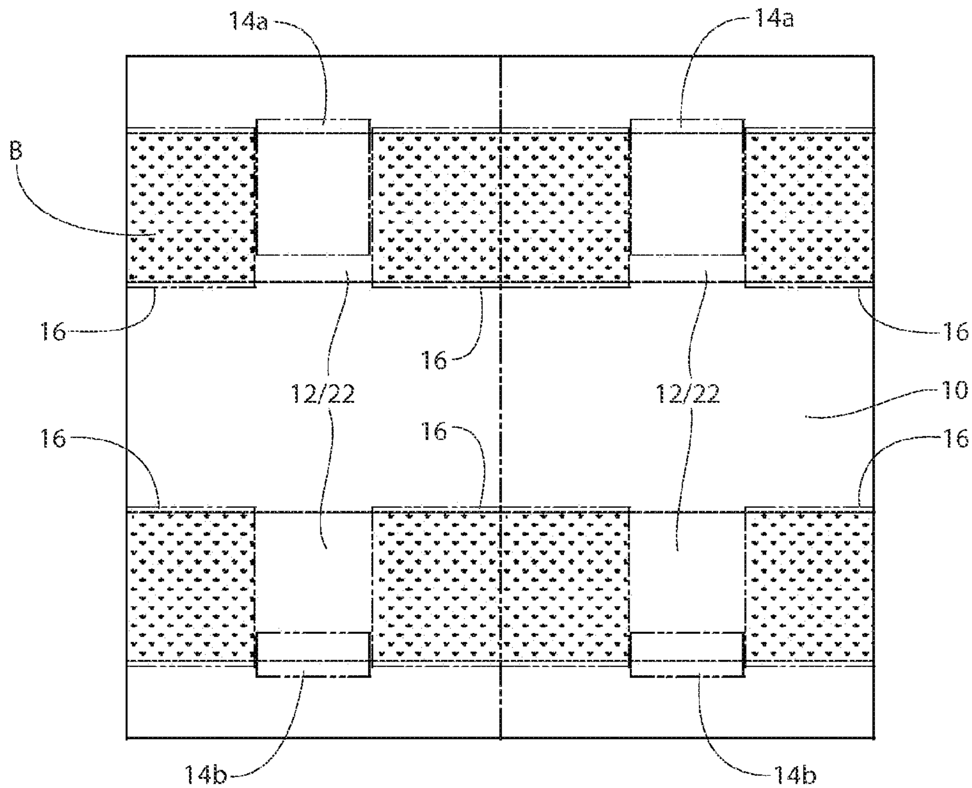
14a
14a
B
16
16
16
12/22
12/22
10
16
16
16
14b
14b

Fig. 10

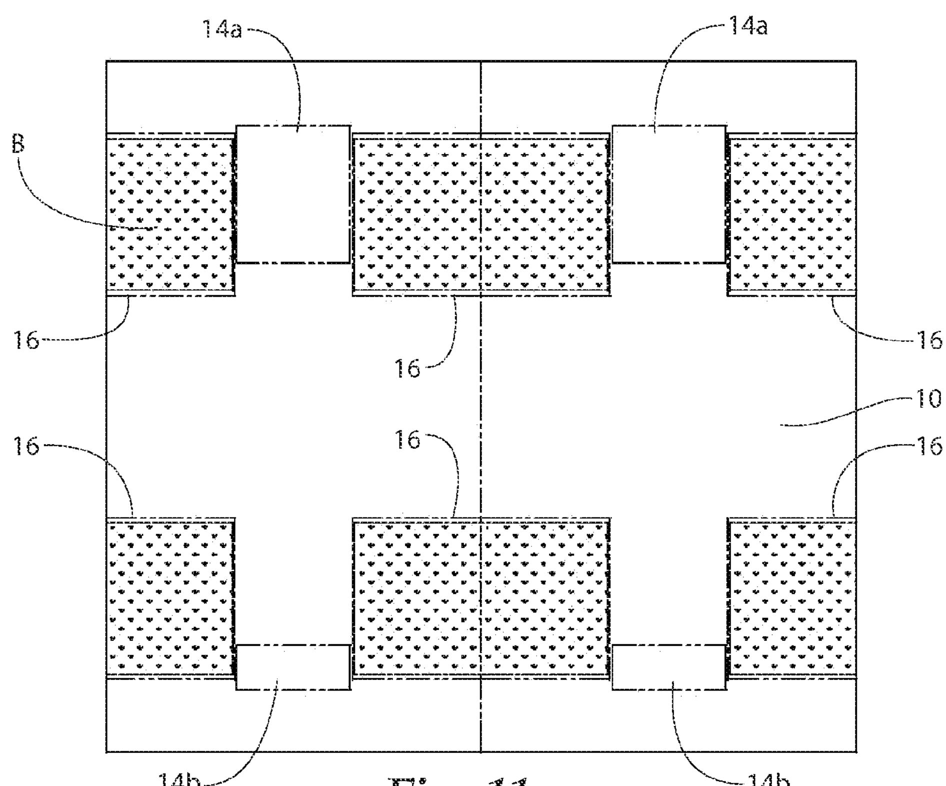
14a
14a
B
16
16
16
10
16
16
16
14b
14b

Fig. 11

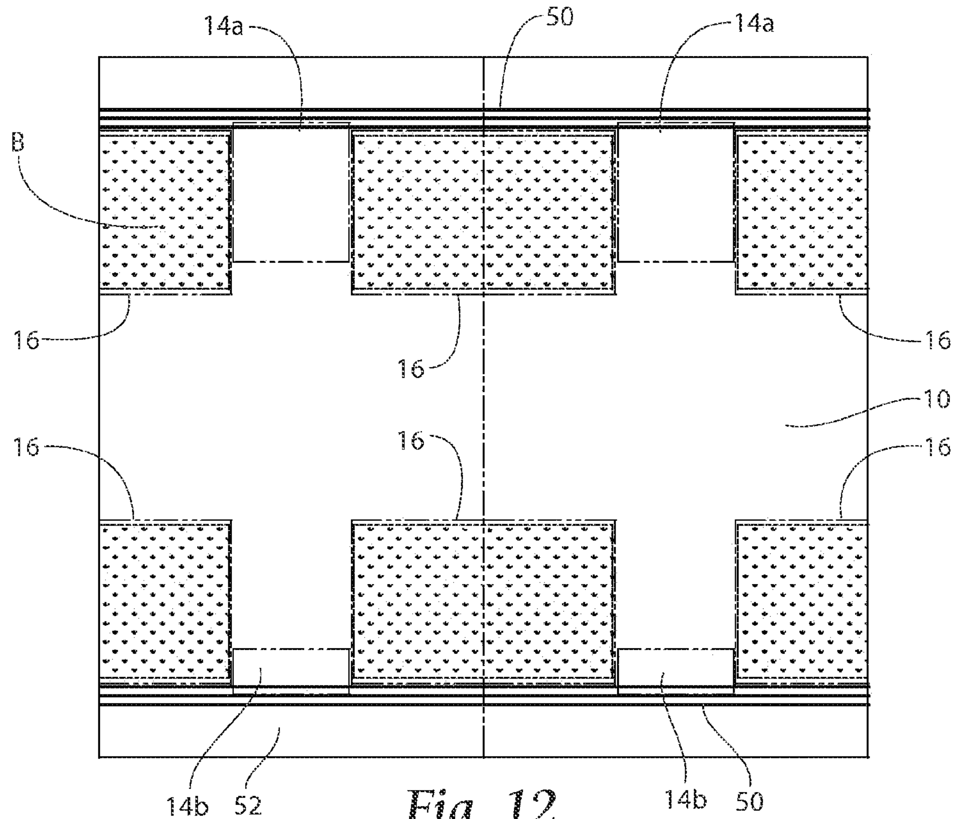
14a
50
14a
B
16
16
16
10
16
16
16
14b
52
14b
50

Fig. 12

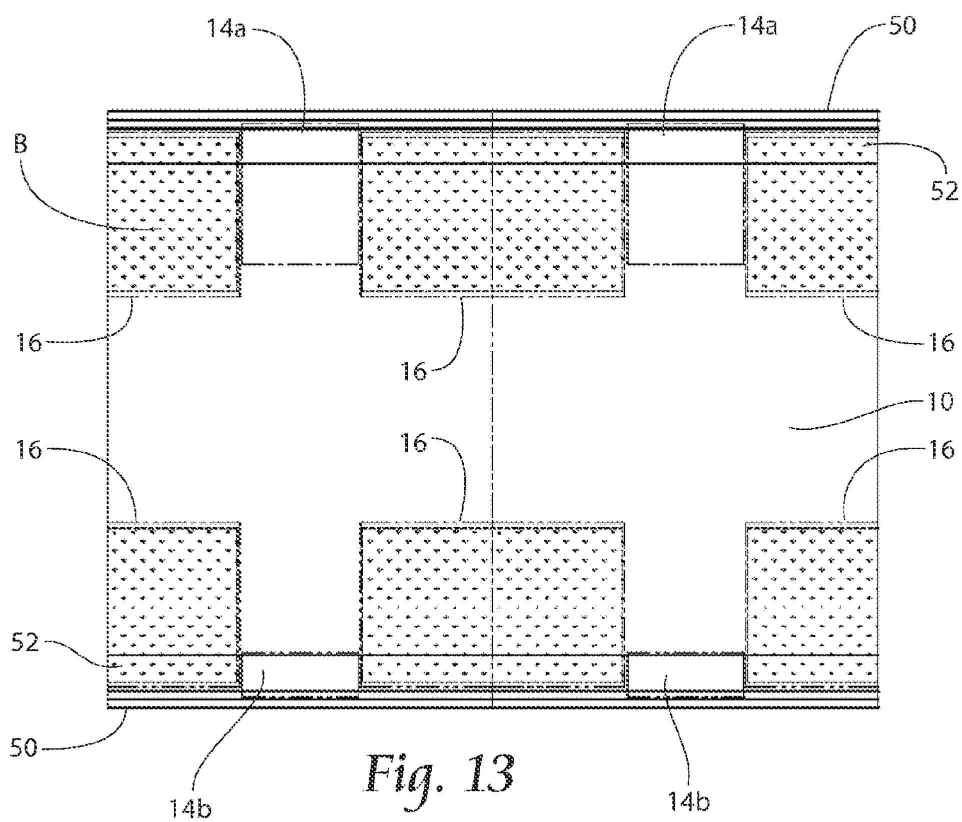
14a
14a
50
B
52
16
16
16
10
16
16
16
52
50
14b
14b

Fig. 13

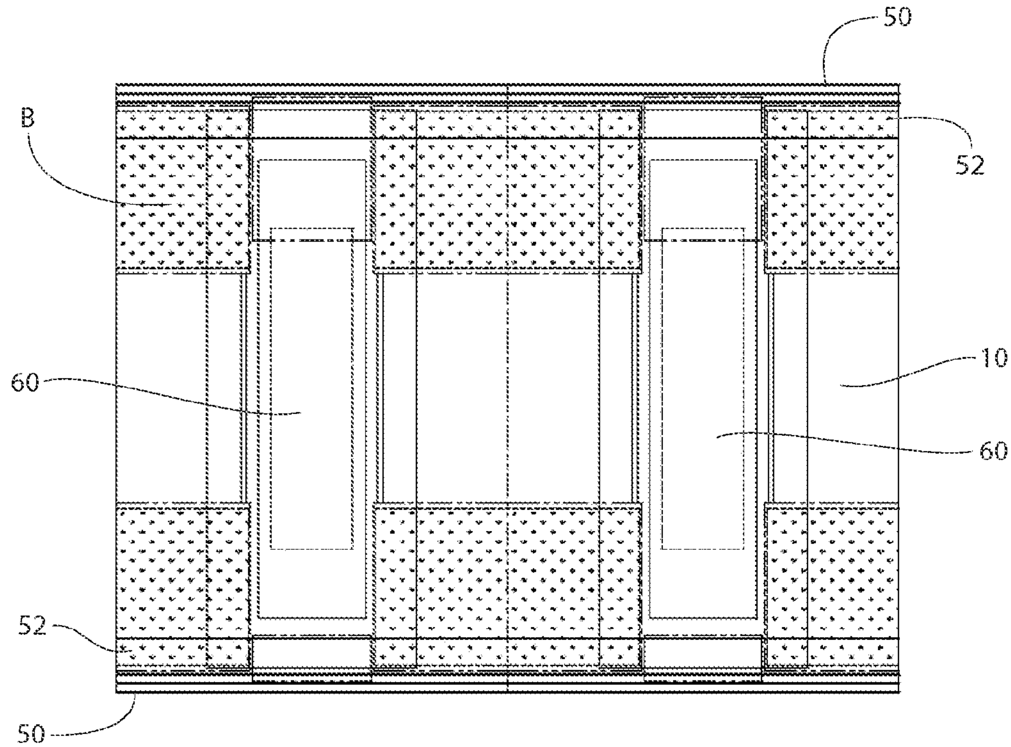

Fig. 14

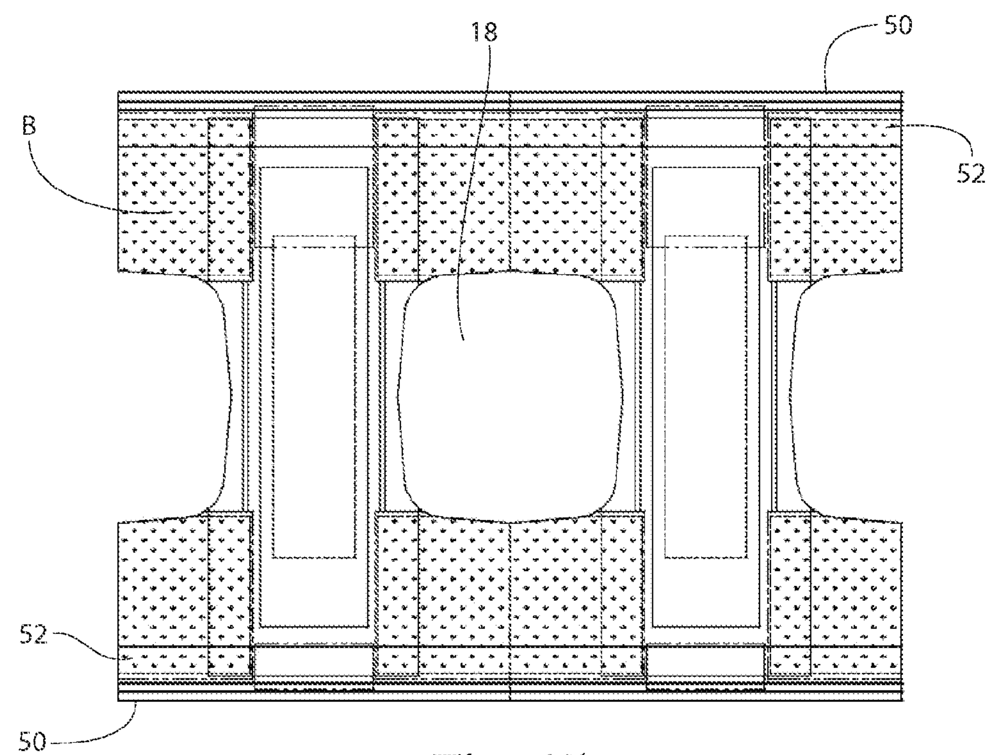

Fig. 15

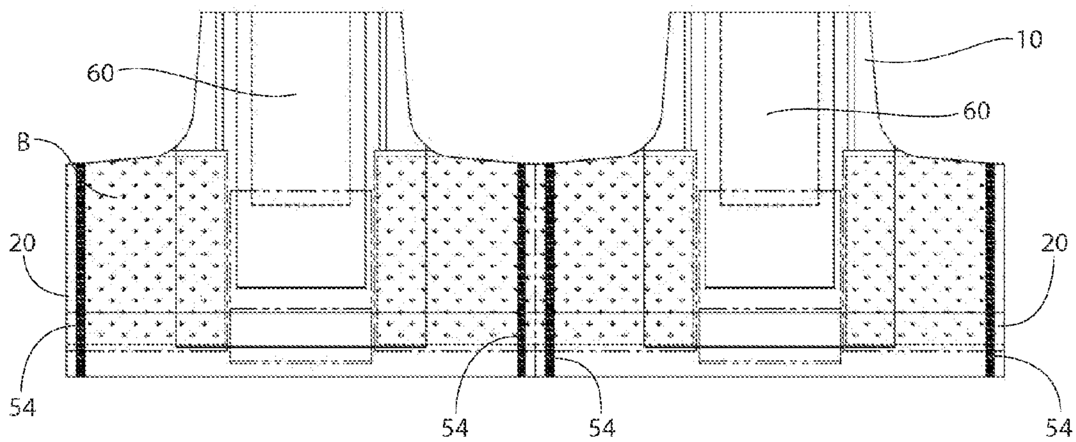

Fig. 16

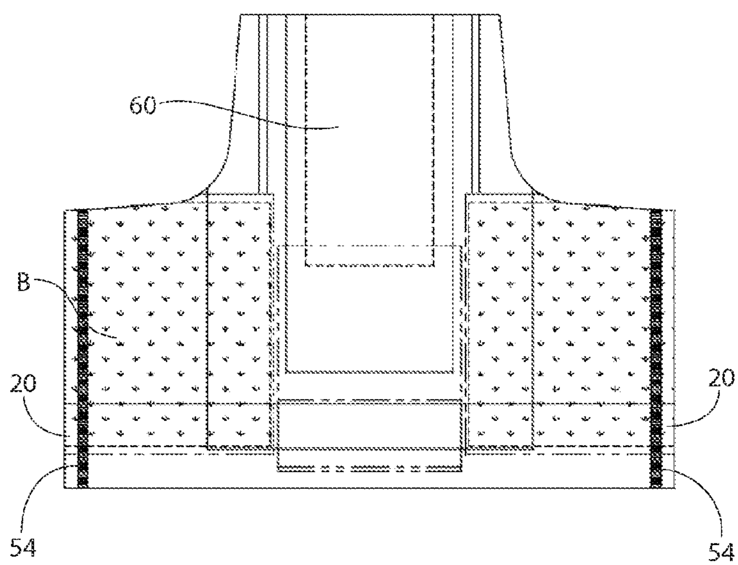

Fig. 17

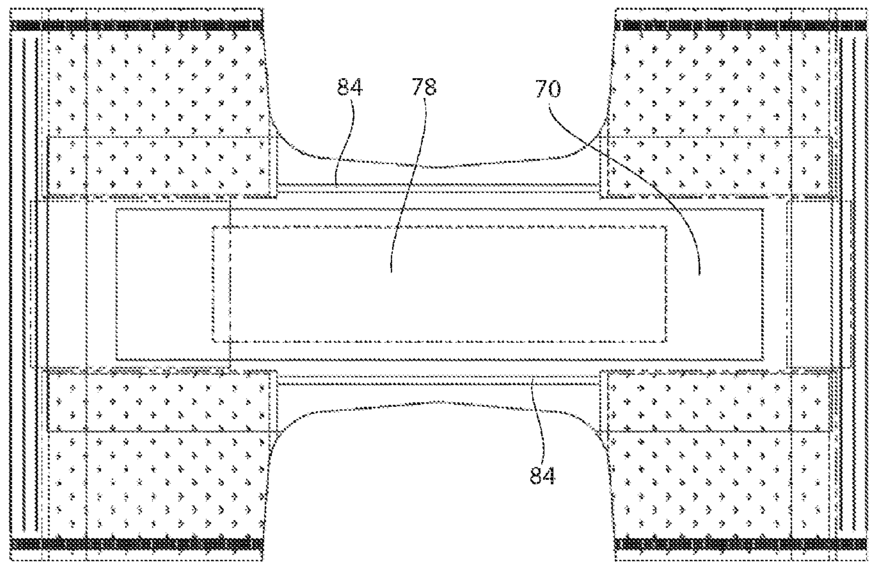
84
78
70
84

Fig. 18

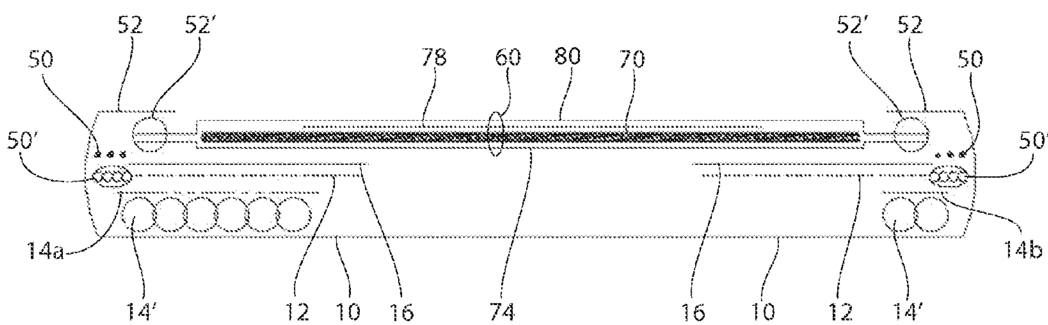
52
52'
78
60
80
70
52'
52
50
50
50'
50'
14a
14b
14'
12
10
16
74
16
10
12
14'

Fig. 19

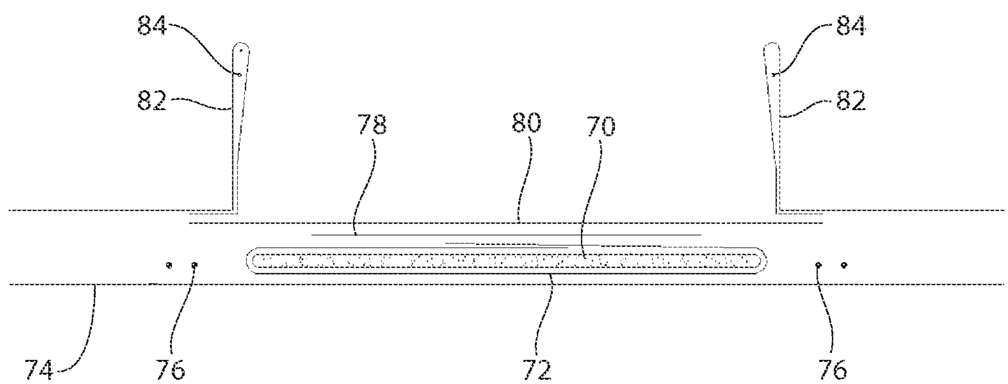

Fig. 20

METHOD FOR PRODUCING ABSORBENT ARTICLE WITH STRETCH FILM SIDE PANEL AND APPLICATION OF INTERMITTENT DISCRETE COMPONENTS OF AN ABSORBENT ARTICLE

RELATED APPLICATION

This is a continuation-in-part application of U.S. patent application Ser. No. 12/979,154, filed 27 Dec. 2010, now U.S. Pat. No. 8,460,495, which claimed the benefit of U.S. Provisional Application Ser. No. 61/335,018, filed 30 Dec. 2009.

BACKGROUND OF THE INVENTION

This invention relates to an apparatus and method for producing absorbent articles with stretch film side panels. The invention disclosed herein relates to apparatus and methods for waste reduction and improvements to the quality and production in web processing operations, such as diaper manufacturing. While the description provided relates to diaper manufacturing, the apparatus and method are easily adaptable to other applications.

Generally, diapers comprise an absorbent insert or patch and a chassis, which, when the diaper is worn, supports the insert proximate a wearer's body. Additionally, diapers may include other various patches, such as tape tab patches, reusable fasteners and the like. The raw materials used in forming a representative insert are typically cellulose pulp, tissue paper, poly, nonwoven web, acquisition, and elastic, although application specific materials are sometimes utilized. Usually, most of the insert raw materials are provided in roll form, and unwound and applied in assembly line fashion.

In the creation of a diaper, multiple roll-fed web processes are typically utilized. To create an absorbent insert, the cellulose pulp is unwound from the provided raw material roll and pulverized by a pulp mill. Discrete pulp cores are formed by a core forming assembly and placed on a continuous tissue web. Optionally, super-absorbent powder may be added to the pulp core. The tissue web is wrapped around the pulp core. The wrapped core is debulked by proceeding through a calendar unit, which at least partially compresses the core, thereby increasing its density and structural integrity. After debulking, the tissue-wrapped core is passed through a segregation or knife unit, where individual wrapped cores are cut. The cut cores are conveyed, at the proper pitch, or spacing, to a boundary compression unit.

While the insert cores are being formed, other insert components are being prepared to be presented to the boundary compression unit. For instance, the poly sheet is prepared to receive a cut core. Like the cellulose pulp, poly sheet material is usually provided in roll form. The poly sheet is fed through a splicer and accumulator, coated with an adhesive in a predetermined pattern, and then presented to the boundary compression unit. In addition to the poly sheet, which may form the bottom of the insert, a two-ply top sheet may also be formed in parallel to the core formation. Representative plies are an acquisition web material and a nonwoven web material, both of which are fed from material rolls, through a splicer and accumulator. The plies are coated with adhesive, adhered together, cut to size, and presented to the boundary compression unit. Therefore, at the boundary compression unit, three components are provided for assembly: the poly bottom sheet, the core, and the two-ply top sheet.

A representative boundary compression unit includes a die roller and a platen roller. When all three insert components are provided to the boundary compression unit, the nip of the rollers properly compresses the boundary of the insert. Thus, provided at the output of the boundary compression unit is a string of interconnected diaper inserts. The diaper inserts are then separated by an insert knife assembly and properly oriented. At this point, the completed insert is ready for placement on a diaper chassis.

A representative diaper chassis comprises nonwoven web material and support structure. The diaper support structure is generally elastic and may include leg elastic, waistband elastic and belly band elastic. The support structure is usually sandwiched between layers of the nonwoven web material, which is fed from material rolls, through splicers and accumulators. The chassis may also be provided with several patches, besides the absorbent insert. Representative patches include adhesive tape tabs and resealable closures.

The process utilizes two main carrier webs; a nonwoven web which forms an inner liner web, and an outer web that forms an outwardly facing layer in the finished diaper. In a representative chassis process, the nonwoven web is slit at a slitter station by rotary knives along three lines, thereby forming four webs. One of the lines is on approximately the centerline of the web and the other two lines are parallel to and spaced a short distance from the centerline. The effect of such slicing is twofold; first, to separate the nonwoven web into two inner diaper liners. One liner will become the inside of the front of the diaper, and the second liner will become the inside of the back of that garment. Second, two separate, relatively narrow strips are formed that may be subsequently used to cover and entrap portions of the leg-hole elastics. The strips can be separated physically by an angularly disposed spreader roll and aligned laterally with their downstream target positions on the inner edges of the formed liners.

After the nonwoven web is sliced, an adhesive is applied to the liners in a predetermined pattern in preparation to receive leg-hole elastic. The leg-hole elastic is applied to the liners and then covered with the narrow strips previously separated from the nonwoven web. Adhesive is applied to the outer web, which is then combined with the assembled inner webs having elastic thereon, thereby forming the diaper chassis. Next, after the elastic members have been sandwiched between the inner and outer webs, an adhesive is applied to the chassis. The chassis is now ready to receive an insert.

To assemble the final diaper product, the insert must be combined with the chassis. The placement of the insert onto the chassis occurs on a placement drum or at a patch applicator. The inserts are provided to the chassis on the placement drum at a desired pitch or spacing. The generally flat chassis/insert combination is then folded so that the inner webs face each other, and the combination is trimmed. A sealer bonds the webs at appropriate locations prior to individual diapers being cut from the folded and sealed webs.

The current practice in applying a stretchable web such as a poly web to a second web is involved continuously feeding the poly web into the process which results in poly running full length of product, or alternatively, full length of a constructed insert core which is then placed onto a nonwoven-type chassis. Not all machine configurations can be adapted from a full length poly chassis to a poly insert configuration due to space and/or cost restrictions. It should be understood that application of the poly web along the entire length of the product, rather than only where it is useful, increases the amount of poly material which must be utilized. This is a waste of the material resource and adds additional cost to the product. It is therefore desirable to create a lower cost product by putting poly into the product only where it is useful, instead of the complete product.

However, typical slip/cut application of poly patch to a continuous web does not work well because of the elasticity of the poly web. The slip/cut process allows the poly to slip on anvil prior to being cut causing the poly to violently snap back at the moment of cut. This can result in a short patch-long patch output from the slip/cut where one or more of the resulting poly patches are extremely distorted on the carrier web. This result is useless for producing a diaper-type product and would be unacceptable to the consumer. It is therefore desirable to provide an apparatus that can cut patches from a poly web while eliminating the snap back of the poly web material.

SUMMARY OF THE INVENTION

One aspect of the invention is a method including providing a base non-woven layer, and applying thereto a character strip. Next, a stretched film is applied over the character strip/base non-woven laminate, and the stretched film is intermittently bonded to the base non-woven. Next, a cover non-woven is applied intermittently to the stretched film, thereby creating a laminate comprising the previously mentioned components.

In another embodiment, the character strip can be interchanged an image on at least one of core insert and a chassis web, for instance in the form of a pre-printed web, or a web printed upon prior to being covered with the stretch woven material.

In one embodiment, the method comprises providing a plurality of pairs of heated knives about a rotatable body, with vacuum commutation provided thereto. The stretched film is cut while stretched, the film being held to the rotating body by the vacuum commutation ports about the rotating body, until the stretched film is trimmed and the trim removed by a second source of vacuum. In this embodiment, a block is used to push material into the rotating heated knives. In an alternative embodiment, vacuum is applied to the stretchable film to drawn the material against the heated knife, thereby severing the stretchable film.

Advantages to the present invention include fewer materials in the side seam bond sandwich, such as 4 instead of the 6-10 layers currently used. Fewer layers assist and facilitate ultrasonic bonding, and result in a more uniform product, because fewer layers are required to be constructed. In alternative embodiments, the product can be configured with or without a waist band.

In another embodiment, simultaneously with the chassis formation, the insert assembly takes place. The formed insert is combined with the formed chassis web, and after this combination is made, the product can be folded and side seam bonded to form a pant style diaper if desired, or tape tabs and ears can be applied to form a wrap around style diaper.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic of a representative web processing system;

FIG. **2** is a cross-sectional diagram showing a representative product configuration of the present invention;

FIG. **3** is a plan view of the laminate produced by a representative web processing system of the present invention prior to introduction of an insert from core forming operations;

FIG. **4** is a side view of a rotating body used to sever elements and create the laminate of the present invention;

FIG. **5** is a schematic of an embodiment of an apparatus for intermittent application of a web to a target web that may or may not be used in conjunction with the present invention to intermittently apply discrete components;

FIG. **6** is an alternative embodiment of an apparatus for intermittent application of a web to a target web;

FIG. **7** is a side view of an alternative embodiment of vacuum application to a knife to sever elements of the present invention;

FIGS. **8**-**17** are a representative sequence of operations showing manufacturing techniques for a product formed according the methods of the present invention;

FIG. **18** is a laid open product formed according to methods of the present invention;

FIG. **19** is a cross-sectional view of a disposable product formed according to methods of the present invention;

FIG. **20** is a cross-sectional view of a core or insert assembly portion of a disposable product of the present invention; the core being introduced to a simultaneously formed chassis we structure to form a disposable product that can be folded and side seam bonded to form a pant style disposable product.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structures. While the preferred embodiment has been described, the details may be changed without departing from the invention, which is defined by the claims.

It is noted that the present techniques and apparatus are described herein with respect to products such as diapers, but as previously mentioned, can be applied to a wide variety of processes in which discrete components are applied sequentially. FIG. **1** describes diaper making generally and schematically.

Referring to FIG. **1**, a web processing operation starts with incorporating raw materials such as paper pulp and super absorbent polymer (SAP) in a pulp mill. The mixture is sent to a core forming drum, where cores are formed for retaining liquids. A core can be placed on or within a tissue and processed as shown. Eventually, the tissue layer essentially sandwiches the core, if desired.

The illustrated method displays a core form on tissue method, where the tissue is carried by a core forming drum and the tissue is pulled into a pulp forming pocket, where air-entrained pulp is then drawn into by vacuum.

The process continues through debulking, core cutting and spacing. At a boundary compression unit, the core/tissue combination is sandwiched between a preferably 3-ply topsheet layer and a printed poly backsheet layer carrying leg elastics. The 3-ply topsheet laminate comprises an acquisition layer, designed to accept liquid insult and distribute the over a larger surface of the core to improve absorption performance and also to prevent reverse migration of liquid escaping from the core. Carried between the acquisition layer and the cuff non-woven layer is an insert non-woven layer **80**.

At the compression unit, a compression roll compresses the materials around the border of the core, to create a topsheet/backsheet sandwich with the core in the middle of the topsheet and the backsheet. At this point, the insert assembly has been formed, and is prepared for introduction to the chassis web assembly shown both on FIG. **1**, and also described with regard to FIGS. **8**-**13** which describe the chassis web assembly. The chassis web assembly can be simultaneously formed in parallel with the insert assembly.

The web can undergo folding, extraction and trimming of excess material, and application of material to tighten the diaper about the waist. Eventually, the product is folded and packaged.

As seen on FIG. **1**, the $\boxed{\circ}$ symbol is shown at locations of introductions of discrete components into the process. At these and other locations of material introduction, inspection can take place to determine the presence or absence of acceptable product introduction. In addition to visual inspection, operational characteristics such as startup/ramp-up/shutdown operations can trigger waste minimization techniques as will be described later.

At each of these operations shown in FIG. **1**, diagnostics can be performed to indicate whether the product meets acceptable criteria. If so, discrete elements, such as the core, tissue layers, elastic, etc., continue to be applied in a sequence such as shown in FIG. **1**. If not, no additional discrete elements need be applied.

Referring now to FIG. **2**, a cross-sectional diagram showing a representative intended product configuration of the present invention is shown. In this embodiment, it is seen that a first base layer of non-woven material **10** is supplied in continuous fashion. Next, a series of character strips **14** are shown, which for instance can comprise artwork or other design or fashion or useful strips of decorative or non-decorative material. Over the character strips **14** are one or more webs of stretch film **12** which are preferably applied continuously, although intermittent application of stretch film **12** can also be used. Next, a cover-non-woven layer **16** is applied, preferably intermittently and preferably in two webs or lanes of material. In other embodiments, the image of the character strips **14** can be deposited or printed on at least one of core insert and a chassis web, for instance in the form of a preprinted web, or a web printed upon prior to being covered with the stretch woven material.

It will be described later that an area of no or little bonding of the stretched film layer **12** to the character strip **14** or base non-woven **10** is achieved across generally the widths D**1** and D**2**. In a preferred embodiment, the width D**2** represents the width of character strip **14**, and that a wider void space D**1** is created over the character strip representative of the distance between intermittent cover non-woven pieces **16**.

The area of no or little bonding of the stretched film layer **12** to the character strip **14** or base non-woven **10** is provided so that the stretched film **12** can be severed and removed from the laminate in areas where the stretched film layer **12** is not desired, such as in areas where the stretched film layer **12** has been not or minimally bonded to the other layers of the laminate.

Referring now to FIG. **3**, a plan view of the preferred laminate produced by a representative web processing system of the present invention is shown.

Leg cutouts **18** can be provided in the base non-woven layer **10** as shown. Side seams **20** are indicated to represent discrete diaper products between successive side seams **20** in the machine direction (right to left or left to right as shown). The character strips **14** can be exposed by severing the stretched film **12** into a removable chip **22** by use of a heated knife applied at areas of roughly equal to or less than width D**1** (See FIG. **2**) and removing the severed film **22** and exposing the strip **14**, which applies a silmu-cut/melt of the stretch film **12** only. This technique is described with reference to FIG. **4**, discussed later. It is preferred that the severing of stretch film **12** be just wider than character strip **14**, and that little or no bonding will have previously taken place between character strip **14** and the stretched film **12**, which will facilitate easy separation of the two elements **12** and **14**.

Still referring to FIG. **3**, it is preferred that the character the first base layer of non-woven material **10** is supplied in continuous fashion. Next, a series of character strips **14** are applied, preferably in two lanes representing the front and back of the diaper, preferably in the midsection of the diaper when worn by a user. The strips **14** preferably are formed of decorative material, and can also be used as a landing zone for tape tabs or other adhesive mechanisms provided on ears or tape tabs of the diaper (not shown).

In an alternative embodiment (See, e.g., FIG. **12**) one or more strands of additional stretchable fabric, such as commercially available Lycra strands of stretchable fabric, can be added to the waist band for added strength if desired. This added fabric can also be applied across the same or narrower regions of the stretch film **12**.

In one embodiment, the non-woven **10** is slip-cut to stretched film **12** and bonded ultrasonically or adhesively (not shown). A patterned bonding roll (with vacuum) may be used if desired.

Referring now to FIG. **4**, a side view of a rotating body **28** used to sever elements **22** and create the laminate of the present invention is shown. A laminate comprising one or more the elements of the laminate shown in FIG. **2** is introduced to the rotating body **28** (not shown) by conventional means. The laminate is introduced and spaced such that the severing across intended with D**1** will be registered to achieve such a cut, by use of knifes **30** spaced apart. The laminate of FIG. **2** will be carried by vacuum commutation ports **32**, and the result will be that preferably only the stretch film **12** is severed, and not the base non-woven layer **10**. Optionally, the character strip can be severed at this point as well, particularly if the character strip is configured to cut/melt and the same temperature as the stretch film **12**, for instance in the range of 225-250° F.

Preferably, the rotating body comprises a series of knifes **30**, acting in pairs spaced apart a distance of approximately D**1** to act upon the stretch film **12** and sever the stretch film **12** into a chip **22** that will be removed once rotated into communication with vacuum hood **36**, which because only stretch film **12** (or, in addition, a small portion of character strip **14**) will be removed and discarded or recycled. Preferably, the knives **30** have silicon lagging, heated knives. In this manner, the knifes can be used to heat sever stretch film **12** after being urged into contact with the heated knives by blocks **34**, which are used to push the laminate of FIG. **2**, including the stretch film material **12** into the rotating heated knives **30**. In an alternative embodiment, vacuum is applied to the stretchable film to drawn the material against the heated knife, thereby severing the stretchable film. In an alternate embodiment shown in FIG. **7**, the knives **30** can be supplied with vacuum ports **40**, which drawn the stretch film into contact with the heated knife blades **30** at desired times to achieve severing the chips **22**.

Optionally, each of the components capable of discrete attachment, such as cover non-woven **16**, character strip **14**, or stretch film **12**, can be applied intermittently using the technique described in relation to the methods and apparatus shown in FIGS. **5**-**6** below. Referring now to FIG. **5**, a diagrammatic view of a zero-waste system **200** for intermittently applying segments **202** of a stretchable material to a target web **206** is shown. The intermittent poly application apparatus and method can be employed at locations of desired intermittent introduction of material to create the laminate shown in FIG. **3**. The intermittent poly application apparatus and method can also be used on other, non-poly application processes where intermittent application of a certain component is desired.

As shown in FIG. **5** the apparatus **200** preferably includes a first continuous web **204** of stretchable material. The stretchable material may be of any type known in the art including, but not limited to a poly material. The system **200** further includes a second continuous web **206**. The second continuous web **206** is preferably of a nonwoven material. The first continuous web **204** is cut into segments **202** and applied to the second continuous web **206**.

The system **200** preferably includes a cutting apparatus **208** for cutting the first continuous web **204** into segments **202**. The cutting apparatus may take any form known in the art.

Accumulator **220** can take any form, such as a servo driven roller that speeds up and slows down, an alternate roller configuration, a rocking roller configuration such as shown in FIG. **5**, or any different means of accumulating the web, such as a miniature accumulator, or a device similar to a diaper cross-folder, or a tucker blade. A similar blade with low inertia could also be employed.

In the illustrated embodiment the cutting apparatus **208** includes an anvil **210** and a knife roll **212**. The anvil **210** is preferably a vacuum anvil. As shown in FIG. **5**, the first web **204** of material fed against the anvil **210** surface and is cut into segments **202** by the knife roll **212**.

The system **200** preferably includes a rate adjustment apparatus **214**. The rate adjustment apparatus **214** is sized and configured to adjust the rate at which the first web **204** is being fed to the anvil **210** while the rate at which the first web **204** is fed to the rate adjustment apparatus **214** remains the same. In the illustrated embodiment, the rate adjustment apparatus **214** takes the form of an infeed conveyor **216** which controls the feed rate of the first web **204** to the anvil **210**.

Preferably, after each segment **202** is cut, the infeed of first web **204** to the anvil **210** is momentarily halted. After an appropriate amount of time has passed, the infeed of the first web **204** to the anvil **210** is resumed. In this manner, the segments **202** may be spaced apart when placed on the second web **206**. It is contemplated that the leading edge **218** of the first web **204** will engage at least a portion of the vacuum anvil **210** after each segment **202** is cut. Preferably, the vacuum anvil **210** is provided with a relatively low amount of vacuum at that point. The vacuum is preferably sufficient to retain the leading edge **218** of the first web **204** in position, with the anvil **210** slipping below the first web **204**. However, the vacuum must be low enough that it does not stretch the first web **204**. It should be understood that this may achieved using any means known in the art including, but not limited to a vacuum manifold.

In a preferred embodiment, after the cut is performed at anvil **210**, the supply of incoming web **204** to the anvil **218** is momentarily stalled, which results in a gap between supply of the discrete pieces of material **202** to the web **206**. Preferably next, the incoming web **204** is then accelerated to feed material to match or nearly match the velocity of roll **210** until the next cut is made. In this sense, the accumulator **220** is used to create the intermittency. The purpose of the speeding and stalling is to prevent snap back of the incoming web **204**.

It is further contemplated that the system **200** may include a tension control device **220**. The tension control device **220** is preferably sized and configured to eliminate tension in the first web **204** prior to cutting a segment **202** from the first web **204**. In this manner when the cut is made the material will not snap back as it would if the first web **204** were under tension. In the illustrated embodiment the tension control device **220** takes the form of a web accumulator **222**. However, it is contemplated that the tension control device **220** could take any form known in the art capable of performing such a function. The tension control device **220** of the illustrated embodiment includes a pair of rollers **224** coupled to a pivoting member **226**. The pivoting member **226** is pivotable between a first and second position. In this manner, the first web **204** is accumulated in the tension control device **220** when the rate adjustment apparatus **214** momentarily halts the infeed of the web **204** to the anvil **210** as described above.

It is contemplated that the segments **202** may be secured to the target web **206** in any manner known in the art. For example, and not by way of limitation, an adhesive may be applied to the surface of the first web **204** prior to cutting the poly web into segments as shown in FIG. **5**. In such an embodiment the system preferably includes an adhesive applicator **228** configured to apply adhesive to the outer surface of the first web **204**. The adhesive applicator **228** may be of any type known in the art.

Alternatively, it is contemplated that adhesive may be applied to the surface of the second web **206** prior to placing the cut segments **202** on the second web **206** as shown in FIG. **6**. In such an embodiment the system preferably includes an adhesive applicator **228** configured to apply adhesive to the outer surface of the second web **206**. The adhesive applicator **228** may be of any type known in the art.

It is further contemplated that the web segments **202** may be ultrasonically bonded to the second web **206**. Bonding positions could be located at positions similar to glue head **228**, but also could be repositioned in the system, or could for instance employ roll **210** as an anvil, and equipped with an additional roll to react with roll **210**, for instance at the 6 o'clock position of roll **210** (not shown in Figs.) Ultrasonic or heat bonding stations could also be employed.

It is contemplated that the system **200** will provide active tension control and feed approach to change the feed of the first web **204** into the slip/cut cutting apparatus **208** at the moment of cut so the first web **204** is not under tension at the cut moment. This will result in a stable cut segment **202** that can be uniformly applied to the second web **206**.

Referring now to FIGS. **8-13** a representative sequence of operations showing manufacturing techniques for a chassis web portion of a product formed according the methods of the present invention is shown. This chassis web portion is intended to be combined with the simultaneously formed core (insert) assembly as described in FIG. **1**.

Beginning with FIG. **8**, indicator patch material in front portions **14***a* and rear portions **14***b* can be applied, preferably one front patch **14***a* and one rear patch **14***b* per product. The indicator patch material **14** is applied to an outer chassis nonwoven material **10**. This indicator patch material **14** can be applied (either adhesively, see, e.g., with adhesive **14'** on FIG. **19**) or printed on the insert. For instance, discrete patches **14***a* and **14***b* could be applied to the material **10**, or the indicator patches **14** could be printed onto the web **10**, or the web **10** could come pre-printed. The indicator patch material **14** is also referred to as a character strip, and this material commonly supplied as artwork and if the product is intended to be a child's disposable product, as a children's oriented art piece.

Next, as shown in FIG. **9**, continuous layers of film **12** are laid down in the positions shown corresponding to the front and rear of the product when eventually formed, covering portions of the patches **14***a* and **14***b*, atop the chassis web **10**. The film **12** is preferably stretched to approximately 200%-500% elongation prior to being laid down. Preferably overlying portions of the laid down stretch film **12**, an inner chassis non-woven **16** is intermittently applied in the positions shown, again corresponding to the front and rear of the product when formed. Portions of the stretch film **22** comprising chips **22** are removed later in the process from the region generally overlying the indicator patches **14**, preferably by use of the hot knife/vacuum procedure depicted in FIG. **4**. The inner chassis non-woven **16**, also known as the side panel non-woven **16**, is preferably applied by slip/cut techniques, but can alternatively be applied intermittently using the mechanism as shown in FIGS. **5-6**.

Referring now to FIG. **10**, the inner chassis non-woven **16**, also known as the side panel non-woven **16** is bonded to the outer chassis nonwoven web **10**. The bonding can be accomplished either ultrasonically, mechanically, or adhesively. It is preferred that the bonding pattern be intermittent to coincide with the shape and size of the previously intermittently applied inner-chassis non-woven **16**. It is noted that the bond between the inner-chassis non-woven **16** and the outer chassis nonwoven web **10** will also capture the elastic stretch film **12**, but only in the portions of the elastic stretch film **12** overlain by the inner-chassis non-woven **16**. This allows for the portions of the stretch film **12** between successive intermittently applied inner-chassis non-woven portions **16** to be removed, as shown in FIG. **11**, using the hot knife/vacuum procedure depicted in FIG. **4**. The elastic film **22** can be cut and removed in the portions previously overlying the indicator patch portions **14**, generally between successive intermittently applied inner-chassis non-woven portions **16**. This can be accomplished by using a hot knife to sever the stretch film **12** (but none of the material underlying the stretch film **12**), and then using a vacuum system to remove the waste chips of the stretch film **12** (not shown).

Referring now to FIG. **12**, strands or bands of waist elastic **50** are placed towards the top and bottom of the web **10**, which will ultimately become the front and rear waist band regions in the finished product. The waist elastic **50** can be coupled using adhesive **50'** as shown in FIG. **19**. The waist elastic **50** is placed away from the waist cap region **52** of the web **10**, so that the waist cap region **52** can be folded over and bonded to capture the elastics **50** with the waist cap **52** as shown in FIG. **13**.

Referring now to FIG. **14**, the previously formed insert assembly **60** (see FIG. **20** for detail on the insert assembly) is introduced to and laid down on the chassis assembly which has been assembled as shown in FIGS. **8-12**, in the position show so that the core **60** is generally coincident with the indicator patch portions **14**, in the center of the final product once produced.

Referring now to FIG. **15**, a leg opening portion **18** of the web **10** is then die-cut and removed, preferably by vacuum. As shown in FIG. **16**, the web **10** is folded over longitudinally and side seam bonds **54** are formed, again preferably but not necessarily ultrasonically, in the regions shown, in order to join the front and the rear of the disposable product together to form a pant style product.

As shown in FIG. **17**, discrete products are formed by severing in between successive side seam bonds **54**, and these products can then be stacked and packaged as desired.

Referring to FIGS. **18** and **19**, a product produced by the methods of the present invention is shown first laid open (FIG. **18**) and in cross-section (FIG. **19**).

The foregoing is considered as illustrative only of the principles of the invention. Furthermore, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described. While the preferred embodiment has been described, the details may be changed without departing from the invention, which is defined by the claims.

I claim:

1. A method of forming a disposable product comprising:
- forming an absorbent core;
- capturing the absorbent core between a topsheet and a backsheet to form a core insert;
- supplying a chassis web;
- coupling a stretch material to said chassis web;
- coupling an intermittent side panel material to said chassis web over said stretch material;
- bonding said side panel to said chassis web;
- removing a portion of said stretch film from said chassis web;
- coupling said core insert with said chassis web.

2. A method according to claim **1**, wherein said topsheet assembly is a three-ply laminate comprising an acquisition layer, a non-woven layer, and a cuff assembly.

3. A method according to claim **1**, the method further comprising:
- providing waist elastic at a waist cap portion of said chassis web;
- folding said waist cap portion of said chassis web over itself and coupling said portion with said chassis web to form a waist elastic portion of said chassis web.

4. A method according to claim **1**, the method further comprising:
- removing a leg portion from said chassis web;
- folding said product and bonding said folded product at side seam locations.

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